OTTER CREEK BRIDGE I
Yellowstone Roads and Bridges
Spanning Otter Creek on Grand Loop Road
Yellowstone National Park
Park County
Wyoming

HAER No. WY-32

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BLACK & WHITE PHOTOGRAPHS

WRITTEN HISTORICAL & DESCRIPTIVE DATA

Historic American Engineering Record
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HISTORIC AMERICAN ENGINEERING RECORD

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Location: Spanning Otter Creek on Grand Loop Road, 2.8 miles south of Canyon Junction, Yellowstone National Park, Park County, Wyoming
UTM: Norris Junction, WY, Quad. 12/538000/4949750

Date of Construction: 1935

Owner: Yellowstone National Park, National Park Service

Use: Vehicular bridge

Designer: Architectural plans by W.G. Carnes, National Park Service
General plans and specifications by H.R. Anguin, Bureau of Public Roads

Builder: Charles M. Smith

Significance: Otter Creek Bridge I typifies the early design philosophy of the National Park Service, which was to use indigenous materials to harmonize man-made features with their natural surroundings. This philosophy is embodied in many of the park's Rustic Style buildings and structures.

Project Information: Documentation of Otter Creek Bridge I is part of the Yellowstone Roads and Bridges Recording Project, conducted during the summer of 1989 by the Historic American Engineering Record, a division of the National Park Service, under the co-sponsorship of Yellowstone National Park, the NPS Roads and Bridges Program, and the NPS Rocky Mountain Regional Office, Denver. Historical research and written narrative by Mary Shivers Culpin, Historian, NPS Rocky Mountain Regional Office. Engineering description by Steven M. Varner, Virginia Polytechnic Institute. Edited and transmitted by Lola Bennett, HAER Historian, 1993.

HISTORY OF GRAND LOOP ROAD

(See HAER WY-24, Yellowstone Roads and Bridges.)

HISTORY OF GRAND LOOP ROAD: LAKE JUNCTION TO TOWER JUNCTION

(See HAER WY-33, Tower Creek Bridge.)

DESIGN AND CONSTRUCTION OF OTTER CREEK BRIDGE

Otter Creek, which had been bridged from the very early days, was listed in Hiram Chittenden's recommendations for improvement of the Yellowstone road system in 1905. He called for the Otter Creek Bridge to be rebuilt with a bridge of shorter spans.[1] In the next comprehensive survey of the road system, Captain Wildurr Willing called for Otter Creek Bridge to be replaced with a "pile trestle 32' long, consisting of pile bents and wooden stringers."[2] Finally, in 1914 a 26-foot double span reinforced concrete culvert was built and two year later concrete handrails were added to the structure.[3]

During the 1930s reconstruction of the Lake Junction to Canyon Junction road, a new Otter Creek Bridge was built. The drawings and plans for the bridge were completed during the winter of 1933 and 1934, and the bridge was completed September 25, 1935.[4]

DESCRIPTION

Otter Creek Bridge I is an arched concrete deck girder type with concrete abutments. The one span bridge has a maximum span length of 22'-5", which is measured from center of support to center of support. The structure length is 68' from end of wing wall to end of wing wall. The deck width is 33' while the bridge roadway from curb to curb is 30' wide.[5]

The arched deck is I'-4" thick and has a 9"x18" concrete curb and is covered with asphalt. The deck slab has ⅝"-diameter reinforcing bars placed transversely near the top and bottom and 1⅛"-diameter reinforcing bars placed longitudinally near the top and bottom. There are ⅝"-diameter hoops at 1-foot centers fastening longitudinally in the curb. The deck has a superelevation of I:12.[6] The guard rail consists of 10"-diameter log posts, 8'-2" on center rising 2'-1" above the curb. They are sunk into an 8"-diameter pipe sunk about 18" into the curb. The rail is an 8 inches diameter log attached with ¾-inch galvanized bolts countersunk on the same side the rail is on, the roadway side. The post is cut back by 2" to receive the rail. The rail received two coats of brown stain.[7]

The design load is 15 tons. The abutments batter 1:12 on the outside and are vertical on the inside. They spring from spread footings on firm material. The wing walls are 22'-9" long. The abutments have ½"-diameter bars on 2-foot centers running horizontally and ½-inch diameter bars at I'-6" centers to ⅝"-diameter bars on 8-inch centers towards the taller part near the perimeter of the abutment, The upstream wing walls have horizontal reinforcing bars of ½-inch diameter at 2-foot centers and the downstream wing walls have the same horizontal reinforcing bars. The upstream wing walls have vertical reinforcing bars of ½"-diameter on 18-inch centers to ¾"-diameter on 6-inch centers farther away from the abutment. The downstream wing walls have vertical reinforcing bars of ½"-diameter on 18-inch centers to ⅝"-diameter on 6-inch centers farther away from the abutment. Again the bars are in two layers near the perimeter. The wing walls have 9'x2' footings. Most of the footing is towards the inside.[8]

In the 1986 Parkwide Road Engineering Study, the Otter Creek Bridge was found to be in poor to fair condition. Moderate to severe spalling of the concrete was found.[9]

ENDNOTES

1.Hiram Chittenden, *Annual Report Upon the Construction, Repairs, and Maintenance of Roads and Bridges in the Yellowstone National Park in the Charge of Hiram A. Chittenden, Captain, Corps of Engineers Being Appendices GGG and KKK of the Annual Report to the Chief of Engineers for 1905* (Washington D.C.: Government Printing Office, 1905) p.2818.

2."Report of Inspection of Bridges in the Yellowstone National Park, Made September 24, 25, and 26, 1909, With Recommendations by request of Captain Wildurr Willing, Corps of Engineers, U.S.A.

3.*Annual Report of the Superintendent of National Parks to the Secretary of the Interior for the Fiscal Year Ended June 30, 1916* (Washington D.C.: Government Printing Office, 1916) p.32. The records indicate that no other bridges were constructed until the 1930s project.

4."Otter Creek Bridge Plans, January 1934," Bureau of Public Roads, U.S. Department of Agriculture. Frank Mattson and Robert Hall, "Report to the Chief Architect for the Period August 26 to September 26, 1935."

5."Bridge Inspection Report, Otter Creek Bridge, August 6, 1986," Federal Highway Administration, Western Direct Federal Division, U.S. Department of Transportation.

6."Otter Creek Bridge Plans, January 1934."

7.Ibid.

8.Ibid.

9."Yellowstone National Park Parkwide Road Engineering Study," Federal Highway Administration, Western Direct Federal Division, U.S. Department of Transportation, 1986.